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(54) Method and system for tracking screen activities in online transactions

(57) A digital evidence system is disclosed. According to one embodiment, the digital evidence system records pertinent screen activities such as data entry into an electronic form, verification of a data transfer and a purchase order by capturing images of displayed web

pages requiring interactions from the user. The captured images are transmitted back to the business and can be retrieved according to a query about any interaction so that the online business could determine what has happened on the user side when a transaction was engaged with the online business.

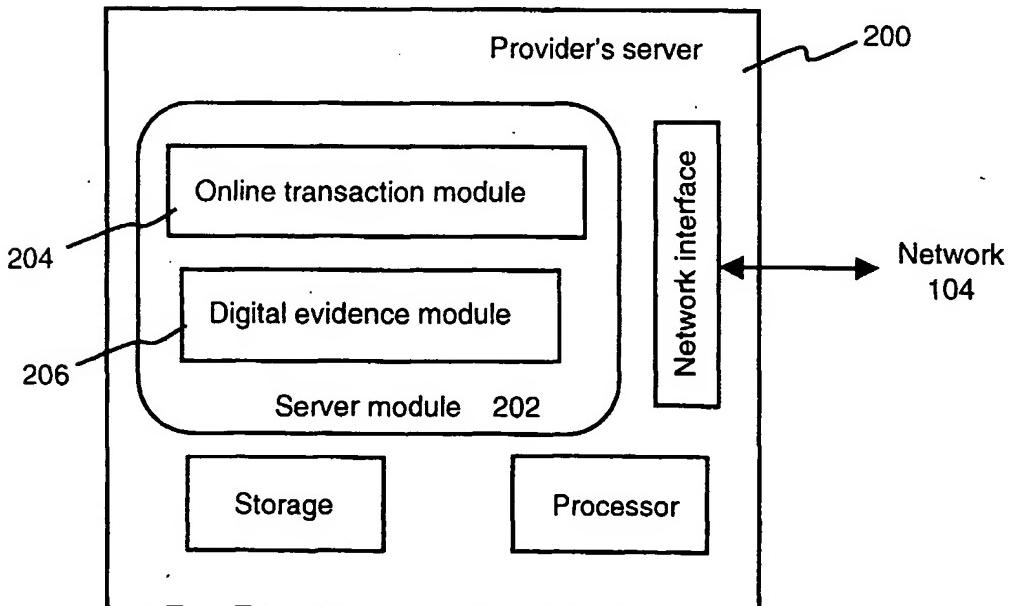


Fig. 2A

Description

[0001] The present invention is related to the area of electronic commerce over the Internet and more particularly related to an electronic method and system for tracking screen activities conducted by a user when the user enters transactions with an online business over the Internet. The screen activities are recorded in images as digital evidence that may be retrieved for verification of the transactions when a need arises.

[0002] The Internet is a data communication network of interconnected computers and computer networks around the world and is rapidly evolving to the point where it combines elements of telecommunications, computing, broadcasting, publishing, commerce, and information services into a revolutionary new business infrastructure. The economy on the Internet is growing in every aspect of life, a wide range of businesses including stock trading, commodities, products, and services ordering are all via the Internet. However, the mushrooming Internet-based electronic commerce (e-commerce) offers opportunities for cyber crimes including credit card frauds, virus attacks, and irrational disputes, which could cost online businesses millions of dollars or more each year.

[0003] Many online businesses, such as www.amazon.com, require a buyer to submit electronically personalized information before any transactions take place. The personalized information including the buyer's address and payment information (i.e. a credit card number) is provided to a merchant as to where to ship and how to charge for purchased items. The merchant however has no actual means to verify that the personalized information submitted is authenticated. For example, the credit card number could be a stolen one or the entire transaction is fraudulent. In other cases, a buyer may dispute that a purchased item that has been delivered from the merchant is not what the buyer originally selected in the transaction. Without any evidence how the buyer entered the order, the merchant often has to admit that a mistake was made on the merchant side by taking the item back and bearing all associated costs. As a result, the online transaction overhead for the merchant goes higher and the Internet economy could be potentially hampered.

[0004] There is, therefore, a great need for a generic solution that provides a merchant with an effective means to study how a transaction is engaged on the buyer's side so that necessary steps could be taken to fairly resolve any disputes or overcome any fraudulent transactions to minimize the online transaction overhead.

[0005] The present invention has been made in consideration of the above described problems and needs and has particular applications to electronic commerce over the Internet. One of the key features of the present invention is to provide a digital evidence system that can support an online business to make a justified decision

or take necessary measures whenever there is a need.

The digital evidence system records pertinent screen activities such as data entry into an electronic form, verification of a data transfer and a purchase order by capturing images of displayed web pages requiring interactions from the user. The captured images are transmitted back to the business and can be retrieved according to a query about any interaction by the user so that the online business could determine what has happened on the user side when a transaction was engaged with the online business.

[0006] In a first aspect the present invention therefore provides a method for tracking screen activities engaged by a user with a client device for online transactions over a data network, the method comprising: requiring an entry from the user to a display after the user decides to enter a transaction over the data network with a provider; receiving image data from the data network, the image data recording the display including the entry by the user; and storing the image data associated with the transaction in a memory space.

[0007] In a second aspect the present invention provides a method for tracking screen activities engaged by a user with a client device for online transactions over a data network, the method comprising: requiring interactions from the user to one or more displays after the user decides to enter a transaction over the data network with a provider; determining if the transaction is complete; receiving image data from the data network if the transaction is complete, the image data recording the one or more displays including the interactions by the user; and storing the image data associated with the transaction in a memory space.

[0008] In a third aspect the present invention provides a method for tracking screen activities engaged by a user with a client device for online transactions over a data network, the method comprising: causing the client device to display an electronic document thereon, the electronic document demanding an interaction from the user before the user is allowed to proceed with a transaction; and receiving image data over the data network from the client device; the image data representing an image of the electronic document including the interaction performed by the user, wherein the image is captured locally in the client device as soon as the user permits to release the electronic document including the interaction.

[0009] In a fourth aspect the present invention provides a method for tracking screen activities engaged by a user with a client device for online transactions over a data network, the method comprising: executing a browsing application to contact a server device over the data network by sending out a request; displaying a page from the server device after the server device responds to the request; the page requiring inputs from the user; activating a screen capturing application to capture an image of the page including the inputs as soon as the user authorizes to release the inputs to the

server device; and transmitting image data representing the image together with the inputs over the data network to the server device.

[0010] In a fifth aspect the present invention provides a method for tracking screen activities engaged by a user with a client device for online transactions over a data network, the method comprising: receiving respectively a sequence of web pages from a server device after the server device is contacted for conducting a transaction over the data network; displaying individually the web pages for inputs from the user; accepting the inputs by showing where the inputs are entered in the web pages; activating a screen capturing application to capture an image of each of the web pages including the inputs every time the user authorizes to release the inputs to one of the web pages to the server device; storing images of the web pages including the inputs in a local memory space; and releasing the images to the server device after the transaction is complete.

[0011] In a sixth aspect the present invention provides a method for tracking screen activities engaged by a user with a client device for online transactions over a data network, the method comprising: receiving a web page from a server device after the server device is contacted for conducting a transaction over the data network; displaying the web page for an input from the user; accepting the input by showing where the input is entered in the web page; activating a screen capturing application to capture an image of the web page including the input as soon as the user authorizes to release the input to the server device; and transmitting image data representing the image together with the input over the data network to the server device.

[0012] In a seventh aspect the present invention provides a system for tracking screen activities engaged by a user with a client device for online transactions over a data network, the system comprising: a server device operated by a provider; the server including a digital evidence module that receives image data from the client device; the client device executing a browsing application that permits the client device to conduct a transaction over the data network with the server device; wherein the image data represents an image of a display including a web page from the server device, the web page requiring an input from the user; the client device executing a screen capturing application to generate the image and convert the image to the image data after the user completes the input; wherein the browsing application causes the image data to be transmitted to the server device; and wherein the digital evidence module associates the image data with the transaction.

[0013] In a eighth aspect the present invention provides a system for tracking screen activities engaged by a user with a client device for online transactions over a data network, the system comprising: a processor; a first memory space for a browsing application, when executed by the processor, to permit the user to conduct the online transactions over the data network with a

server; a second memory space for code of a screen capturing module, the screen capturing module activated only and executed by the processor when the user decides to release to the server one or more inputs entered in a web page by the user; the screen capturing module capturing an image of the web page including the one or more inputs; and wherein the browsing application causes the image together with the one or more inputs to be transmitted to the server.

10 [0014] In a ninth aspect the present invention provides a system for tracking screen activities engaged by a user with a client device for online transactions over a data network, the system comprising: a processor; a first memory space for a browsing application, when executed by the processor, to permit the user to conduct the online transactions over the data network with a server; a second memory space for caching images of screen displays, the images captured successively by a screen capturing application when the user decides to release to the server one or more inputs entered in each of the screen displays; wherein the captured images include the one or more inputs; and wherein the browsing application causes the cached images to be transmitted to the server.

15 [0015] In a tenth aspect the present invention provides a system for tracking screen activities engaged by a user with a client device for online transactions over a data network, the system comprising: a processor; a first memory space for an online transaction module, when executed by the processor, to permit the online transactions with the client device over the data network, the online transaction module causing the client device to display a page requiring one or more inputs from the user; a second memory space for a digital evidence module, when executed by the processor, to work synchronously with the online transaction module; and wherein the digital evidence module receives image data representing an image of the page including the one or more inputs from the client device.

20 [0016] In an eleventh aspect the present invention provides a computer program for tracking screen activities engaged by a user with a client device for online transactions over a data network, the computer program comprising: program code for requiring an entry from the user to a display after the user decides to enter a transaction over the data network with a provider; program code for receiving image data from the data network, the image data recording the display including the entry by the user; and program code for storing the image data associated with the transaction in a memory space.

25 [0017] In a twelfth aspect the present invention provides a computer program for tracking screen activities engaged by a user with a client device for online transactions over a data network, the computer program comprising: program code for requiring interactions from the user to one or more displays after the user decides to enter a transaction over the data network with a provider; program code for determining if the transac-

tion is complete; program code for receiving image data from the data network if the transaction is complete, the image data recording the one or more displays including the interactions by the user; and program code for storing the image data associated with the transaction in a memory space.

[0018] In a thirteenth aspect the present invention provides a computer program for tracking screen activities engaged by a user with a client device for online transactions over a data network, the computer program comprising: program code for causing the client device to display an electronic document thereon, the electronic document demanding an interaction from the user before the user is allowed to proceed with a transaction; and program code for receiving image data over the data network from the client device; the image data representing an image of the electronic document including the interaction performed by the user, wherein the image is captured locally in the client device as soon as the user permits to release the electronic document including the interaction.

[0019] In a fourteenth aspect the present invention provides a computer program for tracking screen activities engaged by a user with a client device for online transactions over a data network, the computer program comprising: program code for executing a browsing application to contact a server device over the data network by sending out a request; program code for displaying a page from the server device after the server device responds to the request; the page requiring inputs from the user; program code for activating a screen capturing application to capture an image of the page including the inputs as soon as the user authorizes to release the inputs to the server device; and program code for transmitting image data representing the image together with the inputs over the data network to the server device.

[0020] In a fifteenth aspect the present invention provides a computer program for tracking screen activities engaged by a user with a client device for online transactions over a data network, the computer program comprising: program code for receiving respectively a sequence of web pages from a server device after the server device is contacted for conducting a transaction over the data network; program code for displaying individually the web pages for inputs from the user; program code for accepting the inputs by showing where the inputs are entered in the web pages; program code for activating a screen capturing application to capture an image of each of the web pages including the inputs every time the user authorizes to release the inputs to one of the web pages to the server device; program code for storing images of the web pages including the inputs in a local memory space; and program code for releasing the images to the server device after the transaction is complete.

[0021] In a sixteenth aspect the present invention provides a computer program for tracking screen activities

engaged by a user with a client device for online transactions over a data network, the computer program comprising: program code for receiving a web page from a server device after the server device is contacted for conducting a transaction over the data network; program code for displaying the web page for an input from the user; program code for accepting the input by showing where the input is entered in the web page; program code for activating a screen capturing application to capture an image of the web page including the input as soon as the user authorizes to release the input to the server device; and program code for transmitting image data representing the image together with the input over the data network to the server device.

[0022] Ideally, a screen capturing module is activated to capture an image or images of displays whenever a user completes an interaction. The interaction may include data entry, verification, and viewing proof of a document. Specifically, an image of the display including the interaction by the user is captured and subsequently transmitted to the server. On the server side, a screen management system employing a digital evidence module configured to cause images of the displays to be captured manages the images and associates the images with a respective account designated to the user or a transaction identification so that it makes possible to later examine the images when there is a query about the user or the transaction.

[0023] The present invention can be implemented in numerous forms. Different implementations of the present invention yield one or more of the following advantages. One advantage of the invention is that an effective digital system is provided to online businesses to track screen activities conducted by users who engage in various transactions with the businesses so that the businesses can take necessary steps or make justified decisions when disputes or frauds arise. Another advantage of the invention is to activate the screen capturing process automatically when a user authorizes to release the user-provided data. The screen capturing process can be performed explicitly or implicitly depending on a particular implementation. Still another advantage of the present invention is the management of the screen images that need to be retrieved only when there is a need.

[0024] Accordingly one of the objects of the present inventions is to provide a digital evidence system that can be used effectively to support the online business of many kinds.

[0025] Objects and advantage together with the foregoing are attained in the exercise of the invention in the following description and resulting in the embodiments illustrated in the accompanying drawings.

[0026] These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings where:

Figure 1 shows a system configuration in which the present invention may be practiced;

Figure 2A shows a functional diagram of a provider's server according to one embodiment of the present invention;

Figure 2B shows a process flowchart of a digital evidence module used in the provider's server of **Figure 2A**;

Figure 2C shows a functional block diagram of a digital evidence module according to one embodiment used in an exemplary system;

Figure 3A illustrates an exemplary web page requiring a user to enter quantity information to be released to a server;

Figure 3B illustrates another exemplary web page requiring a user to enter personal information to be released to a server;

Figure 4A shows a process flowchart of the present invention in the client device according to one embodiment; and

Figure 4B shows a process flowchart of the present invention in the client device according to another embodiment.

[0027] According to one aspect of the present invention, a method and system for tracking screen activities performed by a user on a client device communicating over a data network with a server device are disclosed. Such client device may include, but not be limited to, a personal computer, a palm-sized device and a wireless mobile device, all including a display screen and is capable of two-way communication. The data network can be the Internet and the server device may be any computing device operated by a provider that may include, but not be limited to, a retailer, a merchant, an online business, a service provider or a brokerage firm. With the employment of the present invention, the provider can be supported with a digital evidence system that records anything entered by the user and hence make justified decisions with respect to any possible disputes or frauds.

[0028] In the following detailed description of the present invention, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will become obvious to those skilled in the art that the present invention may be practiced without these specific details. In other instances, well known methods, procedures, components, and circuitry have not been described in detail to avoid unnecessarily obscuring aspects of the present invention. The detailed description is presented largely in terms of procedures, logic blocks, processing, and other symbolic representations that directly or indirectly resemble the operations of data processing devices coupled to networks. These process descriptions and representations are the means used by those experienced or skilled in the art to most effectively convey the substance of their work to others skilled in the art. The method along with

the system to be described in detail below is a self-consistent sequence of processes leading to one or more desired results. It proves convenient at times, principally for reasons of common usage, to refer to data as messages, requests, values, elements, symbols, terms, numbers, or the like. It should be borne in mind that all of these similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities.

[0029] Referring now to the drawings, in which like numerals refer to like parts throughout the several views. **Figure 1** shows a system configuration 100 in which the present invention may be practiced. As used herein, a service, a product provider, or simply a provider represents one of numerous businesses, entities, merchants or retailers that offer various products, applications and services online. Examples of such a provider may include www.amazon.com that offers items from books to consumer electronics, www.ameritrade.com that offers services to allow investors to trade stocks online, and www.evc-aips.com that offers home study services for traffic education.

[0030] As shown in the figure a provider 102, through a server computer, is coupled to a data network 104 that may be the Internet or a network of private and/or public networks. To facilitate online transactions between the provider and a user (e.g. a consumer), a third party entity 106, also through a server computer, is coupled to network 104. Third party entity 106 may represent a financial or authorized institution, such as a bank, a credit card authority or an agent, that provides a mechanism for the provider to verify various information submitted by the buyer, to collect charges for items purchased by the user or to electronically proof anything required by the provider for the user.

[0031] As used herein, a transaction means an electronic agreement mutually agreed between two entities. For example, a transaction occurs when a provider accepts an order of certain items from a buyer. Likewise a transaction is deemed to occur when pertinent data/information entered/provided by one side is released to the other side. In general a transaction means a sequence of information exchange and related work (such as database updating) that is treated as a unit for the purposes of satisfying a request and for ensuring database integrity. For a transaction to be completed and database changes to occur, a transaction has to be completed in its entirety. One of the common transactions over the Internet is a catalog merchandise order by a customer. When the order is received on the server side, the order transaction involves checking an inventory database, confirming that the item is available, placing the order, and confirming that the order has been placed and the expected time of shipment. If the order is deemed as a single transaction, then all of the steps must be completed and validated before the transaction is successful and the database is actually changed to reflect the new order.

[0032] To follow up with the above explanation, services provided online by an entity may include, but not be limited to, stock trading, various education programs, various registrations, electronic tax filing, voting, online gambling and testing, and typically involve data entry or pertinent information to be supplied by a user. For example, in stock trading, a user must enter a stock symbol, a number of shares and sometimes a share price when a trading web page is displayed. Further, it is defined without the loss of generality that an interaction involves activities performed by a user with respect to a displayed page. In the above example, the stock information entered to the trading web page by the user is deemed as an interaction when the trading web page is completed. One of the key features in the present invention is to record the interaction as a digital evidence so that the interaction can be retrieved later on when there is a need to review it.

[0033] For illustration purpose, a user 108 communicates with provider 102 through a computing device, referred to as a client device, that may include, but not be limited to, a personal computer, a palm-size computing device, a wireless mobile device and a personal data assistant (PDA), all having a display screen and capable of two-way data communications with data network 104 for ordering electronically products or services from an online business, receiving a confirmation, or making payment thereafter.

[0034] To facilitate the description of the present invention, it is defined herein a display screen or a screen is the physical display apparatus in a device, such as a 15 inch CRT or LCD monitor commonly seen with a personal computer. A screen display, a displayed web page, a displayed window or simply a display is an image presented on the display screen. For example, a file that constitutes a display may be an HTML file, wherein HTML stands for HyperText Markup Language, an image thereof appears on a display screen when the file is read or executed by a browser.

[0035] For completeness, a service provider 110, also through a respective server computer, is coupled between network 108 and sub-network 112. Typically, sub-network 112 that may be part of network 108 or a local area network (LAN) belonging to a community serves its own community comprising a number of set-top boxes 114, each representing an access to the service provider from a user or a consumer. In general, each of set-top boxes 114 may be a personal computer, a palm-size computing device, a mobile device or a cable control box facilitating an Internet server via a cable. Via service provider 110 that may include an Internet service provider, a wireless carrier, a cable service provider, or any data service provider, each of set-top boxes 114 can communicate with provider 102 for ordering electronically a product or a certain type of services from provider 102.

[0036] Referring now to Figure 2A, there is shown a functional diagram of a provider's server 200 according to one embodiment of the present invention. Server de-

vice 200 may be a personal computer or a workstation used by provider 102 of Figure 1 to offer products for sales or services online and typically loaded with a server module 202 that may be configured to include an online transaction module 204 and a digital evidence module 206. Online transaction module 204 may be any one of the commercially available or customized applications that facilitate transactions with a client device over a network. One exemplary online transaction module 204 may be the one used at www.officemax.com that permits a user to select and make an order of an item for sale.

[0037] Figures 3A-3B show respectively one of the exemplary functions that online transaction module 204 performs. As shown in Figure 3A, after a sequence of selection, a buyer finally determines to purchase a commercial file cabinet. A web page 300 is displayed on a screen of a computing device for the buyer and requires the buyer to enter a quantity to purchase. The computing device may be executing a browser such as a Netscape Communicator from www.netscape.com or an Internet browser from www.microsoft.com. To proceed with the purchase, web page 300 displayed by the browser demands that the buyer has to click "Checkout" 304 to proceed with the purchase. As soon as "Checkout" 304 is clicked, the browser generates a message including the quantity information and sends the message to online transaction module 204 that subsequently stores the quantity information, preferably, associated with a transaction identification or a user account designated to the buyer. If online transaction module 204 determines that additional information about the buyer is needed, a response to the message is then sent out from the server device and causes the browser to display a next web page 310 as shown in Figure 3B. Web page 310 as displayed requires the buyer to provide the required additional information so that online transaction module 204 is ensured to fulfill the purchase order.

[0038] In the above example, online transaction module 204 captures typically text information entered by the buyer but could be deceived by a purchase dispute. For example, wrong quantity information was entered at 302 of Figure 3A, and the purchase dispute could claim that online transaction module 204 has misinterpreted the message and subsequently causes the provider to be responsible for all costs associated with the wrong quantity information. The above example illustrates only one aspect of how online transaction module 204 could be subject to a possible fraud. There are many similar or more damaging incidents, collectively referred to as the cyber crime or fraud over the Internet. One of the key advantages and benefits in the present invention is to minimize such disputes or frauds by providing digital evidence related to the user's screen activities.

[0039] Referring back to Figure 2A, digital evidence module 206 controls screen capturing process. Figure 2B shows a process flowchart of digital evidence module 206 according to one embodiment of the present in-

vention. When a client or computing device used by a buyer is caused to establish a data link with a provider's server and proceeds with a purchase order, online transaction module 204 retrieves an account for the buyer or establishes an account for the buyer if the buyer is new to the provider. The account may be updated with information received from the data link as to where and how the computing device has requested such link to be established thereto. The information may include an address identifier of the computing device. One exemplary address identifier is an Internet protocol (IP) address from which the computing device communicates with the server. The IP address may be assigned by an ISP when the computing device is logged onto the ISP for communication over the Internet.

[0040] The information may further include what browsing tool or application (e.g. a browser) the computing device is using to interact with the server. One of the browsing tools may be an Internet browser that generates requests to contact a server with its own identity therein. With the data link established between a client device and the server device and after the user browsed to an appropriate site or page (e.g. to engage in a transaction), at 220 a web page requiring user's interaction is sent to the computing device. The interaction may include a data entry, a click on a predefined area or metaphor or a click to cause a display of an electronic document as an acknowledgement.

[0041] At 222, it is to determine if the page just sent to the client has any embedded screen capture or capturing application (capability). The screen capturing application is preferably a computer program or an application, when executed, capable of recording one or more selected window screen displays or the entire display screen of the client device. One exemplary screen capturing product, called "FullShot", has similar concepts in the screen capturing application and is offered from Inbit, Inc. located at 1340 South De Anza Boulevard, Suite 202, in San Jose of California 95129. FullShot permits a user to selectively capture an entire display or one or more displayed windows in the display screen.

[0042] If it is determined that the client device does not have any screen capturing application, a provider's preferred screen capturing application can be explicitly uploaded into the client device (i.e. the client device downloads the provider's preferred screen capturing application). The preferred screen capturing application may be a thin and modified version of FullShot and performs only screen capturing function. For example, web page 300 of Figure 3A is a displayed window that can be captured by executing the preferred screen capturing application. Given the description of what the preferred screen capturing application intends to do, those skilled in the art will have no difficult to implement such screen capturing application.

[0043] In one preferred implementation, the screen capturing application is implemented as an applet that

is embedded in a web page. When the web page is loaded in a client device and caused to be displayed thereon, the applet is activated to capture the web page with user's inputs as soon as the user clicks on a designated area or link (hence leading to "Y" of 222 of Figure 2B).

[0044] As described above, a message is generated when the buyer clicks "CHECKOUT" 304 of Figure 3A, the message includes what the buyer entered. One of the features in the present invention is to capture the displayed window (e.g. displayed web page 300) when the buyer clicks "CHECKOUT" 304. The preferred screen capturing application is executed when the buyer clicks "CHECKOUT" 304. In other words, an execution command is placed inherently with a clickable area, such as a hyperlink, an "hot" area or metaphor, a soft key or a designated sign. The captured displayed window is generally in a digital image format that can be cached in a local memory or sent out with the message. At 226, such images are successively received from the client device every time the buyer is asked to click a pre-defined area in the web page such as "submit", or "checkout", etc., or collectively received as a set of image data from the client device when the buyer finishes the transaction.

[0045] In some applications, each of captured images related to a transaction is preferred to be sent out individually, for example, together with data provided to a particular page. In other applications, each of captured images is initially cached in a local memory and the stored images are collectively sent out as soon as a transaction is complete.

[0046] Generally, the images received from a client device are kept as a digital evidence of the screen activities in a database or a storage device and preferably associated respectively with transaction identifications or user accounts for future references as illustrated in Figure 2C in which digital evidence module 250 interfaces with a storage device or a database 252. In a case that a purchase dispute arises from a buyer, a set of screen images can be retrieved at 236 from the database or the storage device according to a query 254 related to a user account or a transaction ID involved in the purchase dispute. The set of images can be sequentially displayed at 238 in an order that the buyer proceeded, the provider can determine how or what screen activities engaged by the buyer at the time the related transactions occurred and makes a justified decision by examining the digital evidence at 240.

[0047] Referring to Figures 4A-B, there are respectively shown a process flowchart of the client device according to one embodiment of the present invention. In accordance with the description above, Figures 4A-B shall be understood in conjunction with preceding figures. At 402 of Figure 4A, the client device establishes a data link with the provider's server. The data link preferably includes a secure session when personal or financial information is transmitted over an open data network, such as the Internet. The two of the popular brows-

ers, Netscape Communicator and Internet Explorer, all provide such mechanism to establish a secure session with the server when the server requires private data by sending a flag signal to activate the secure session. Typically a user is offered to select any items or services of interest or browse the entire site of the provider. When the buyer decides to enter a transaction for one or more items or services, the browser prompts to the buyer a screen for personalized information that may include number of shares of a particular stock to trade at a pre-defined price, entry of an electronic form and decisions on any electronic agreement (often seen from a brokerage web site), a particular product and a type of service. One example of such screens may be web page 310 of **Figure 3B** in which a lot of personalized data must be entered. As soon as the user permits a submission of the data by clicking a "continue", the screen is instantly captured at 408 and the image thereof is associated with the data just entered by the user. At 410, the captured images are processed. One of the reasons for processing the images is to make the transmission of the images to the server more efficiently so that the user does not have to wait for too long before seeing a next screen. As it is well known to those skilled in the art that the screen images, especially those from HTML-based web pages, comprise large homogenous areas that are appropriate for some of the image compression techniques such as Run-Length-Encoding or LZW compression. The resultant compressed image may have a much smaller size than the original does, thus making the transmission of the captured screen images to the server at 412 fast enough so that the user would not feel prolonged latency resulting from the transmission of the screen images.

[0048] Referring now to **Figure 4B**, there is shown a process flowchart modified from **Figure 4A**. After screen capturing application is activated at 408 of **Figure 4A**, the captured images are cached in a local memory at 420. The captured images may be a processed version of the original images depending on an implementation preference. At 420, it needs to determine if the current transaction is completed. This may be achieved by a message received from a server. If the transaction is incomplete, the user is required to continue with the transaction. When it is determined that the current transaction is complete at 422, all the captured images in the local memory are processed for transmission at 424.

[0049] One of the differences between processes in **Figure 4A** and **Figure 4B** is how the captured image is handled depending on application needs. In many purchase order transactions, **Figure 4B** may be preferable as the captured images are not transmitted to the server till a buyer completes an order. In some applications, such as a proof of viewing a document, the captured image shall be released immediately to a server that seeks the proof.

[0050] The flowchart processes respectively in **Fig-**

ures 2A and 4A-4B along with the detailed description have made it evident to those skilled in art that the present invention can be implemented in numerous forms such as a system, a method or a computer readable medium. The present invention is preferably integrated with a browser or a browsing application so that no additional procedures are required from users. In one implementation, the present invention is implemented as a plug-in that can be downloaded into a client device. 10 In another implementation, the present invention is implemented as an applet or an executable application that goes with some of the web pages requiring user's inputs. Alternatively, an implementation of the present invention may be downloaded from a predesignated 15 server when a client device communicates with a provider's server and is caused to do so.

[0051] Different implementations of the present invention yield one or more of the following advantages. One advantage of the invention is that an effective digital 20 system is provided to online businesses to track screen activities conducted by users who engage in various transactions with the businesses so that the businesses can take necessary steps and make a justified decision when disputes or frauds arise. Another advantage of the 25 invention is to activate the screen capturing process automatically when a user authorizes to release the user-provided data. The screen capturing process can be performed explicitly or implicitly depending on a particular implementation. Still another advantage of the 30 invention is the management of the screen images that need to be retrieved only when there is a need.

[0052] The present invention has been described in sufficient details with a certain degree of particularity. It is understood to those skilled in the art that the present 35 disclosure of embodiments has been made by way of examples only and that numerous changes in the arrangement and combination of parts may be resorted without departing from the spirit and scope of the invention as claimed. For example, the present invention may 40 be practiced independently from an online transaction module and can be used to capture displayed pages for collecting evidences or updating a digital evidence system. Accordingly, the scope of the present invention is defined by the appended claims rather than the foregoing 45 description of embodiments.

Claims

- 50 1. A method for tracking screen activities engaged by a user with a client device for online transactions over a data network, the method comprising:
55 requiring an entry from the user to a display after the user decides to enter a transaction over the data network with a provider;
receiving image data from the data network, the image data recording the display including the

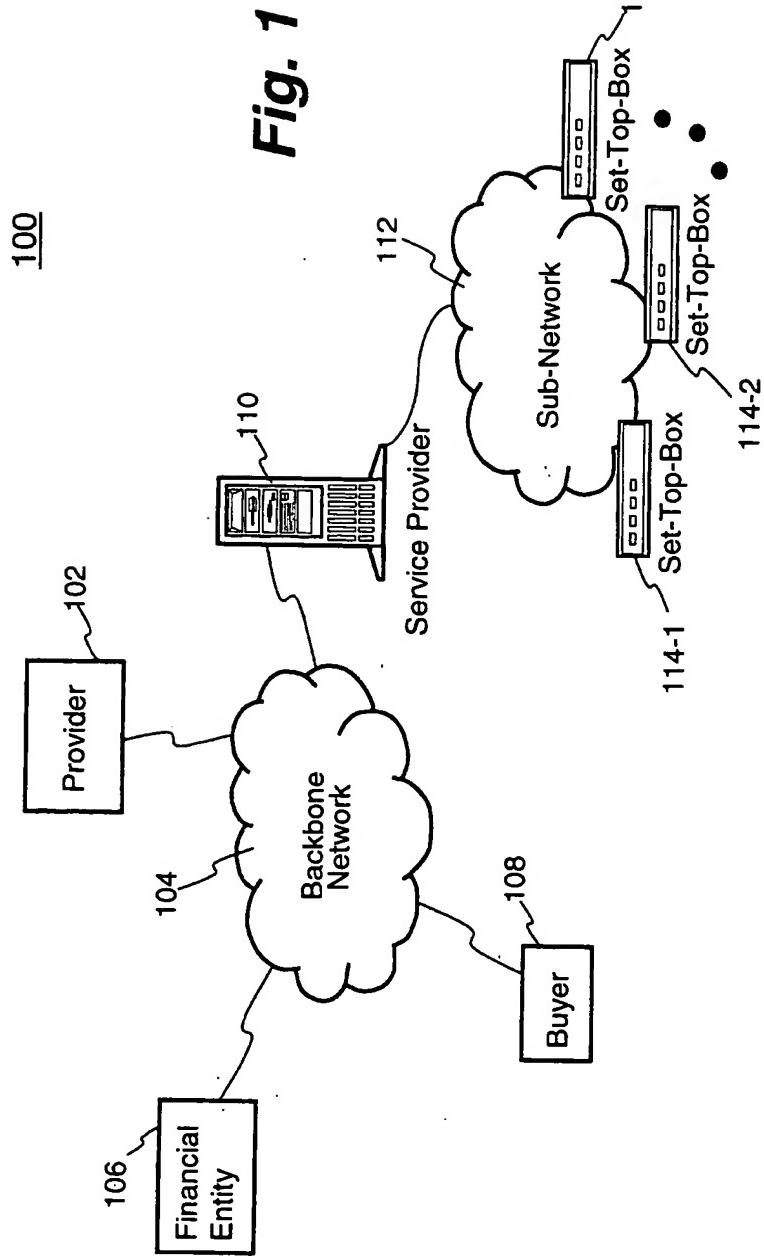
- entry by the user; and
storing the image data associated with the transaction in a memory space.
2. The method of claim 1, wherein the step of requiring an entry comprises:

causing the client device to display a form that must be filled by the user; and
causing the client device to activate a screen capturing application to take an image of the form. 5
3. A method for tracking screen activities engaged by a user with a client device for online transactions over a data network, the method comprising:

requiring interactions from the user to one or more displays after the user decides to enter a transaction over the data network with a provider;
determining if the transaction is complete;
receiving image data from the data network if the transaction is complete, the image data recording the one or more displays including the interactions by the user; and
storing the image data associated with the transaction in a memory space. 10
4. The method of claim 3; wherein the step of requiring interactions from the user comprises:

causing the client device to capture an image of each of the one or more displays including the interactions by the user; and
causing the client device to store the image in a local memory thereof. 15
5. The method as claimed in any of the preceding claims, wherein the display is one of (i) an electronic form requiring one or more selections from the user, (ii) a service agreement requiring at least one electronic signature from the user, (iii) a purchase order requiring at least quantity information, and (iv) a displayed page requiring inputs from the user. 20
6. The method as claimed in any of the preceding claims; wherein the image data is a compressed version of the image so that the transmission of the image over the data network can be efficient. 25
7. A method for tracking screen activities engaged by a user with a client device for online transactions over a data network, the method comprising:

causing the client device to display an electronic document thereon, the electronic document demanding an interaction from the user before 30
- the user is allowed to proceed with a transaction; and
receiving image data over the data network from the client device; the image data representing an image of the electronic document including the interaction performed by the user, wherein the image is captured locally in the client device as soon as the user permits to release the electronic document including the interaction. 35
8. The method of claim 7 further comprising associating the image data with an account designated to the user so that the image data can be retrieved whenever there is a query about the user or the transaction. 40
9. The method of claims 7 or 8, further comprising associating the image data with the transaction so that the image data can be retrieved whenever there is a query about the transaction. 45
10. The method as claimed in any of claims 7 to 9, wherein the interaction includes one or more of (i) data entry by the user to the electronic document, (ii) a click on a designated area of the electronic document and (iii) a click to display a new electronic document. 50
- causing the client device to display an electronic document thereon, the electronic document demanding an interaction from the user before 55



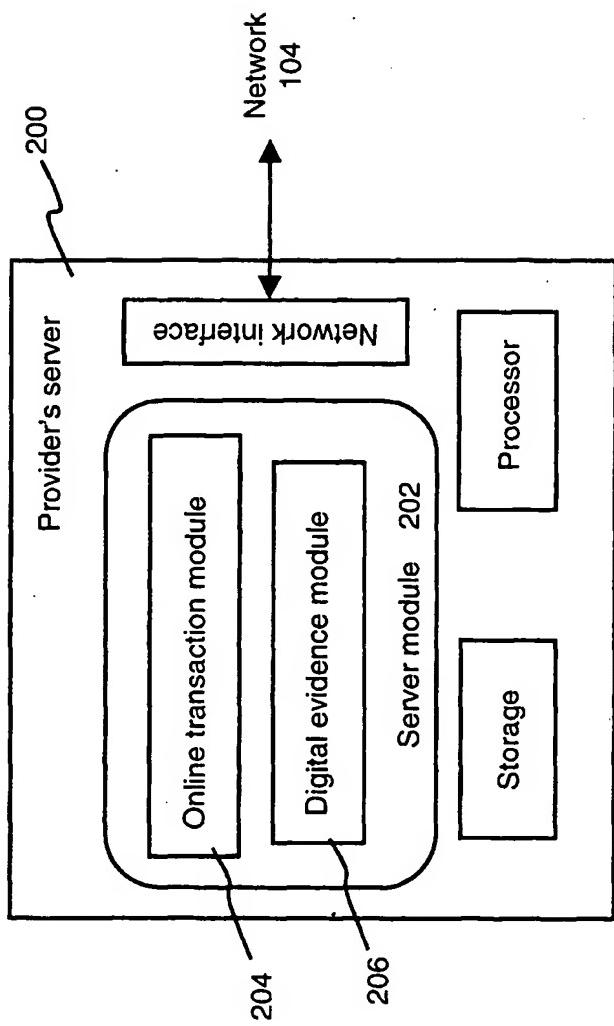
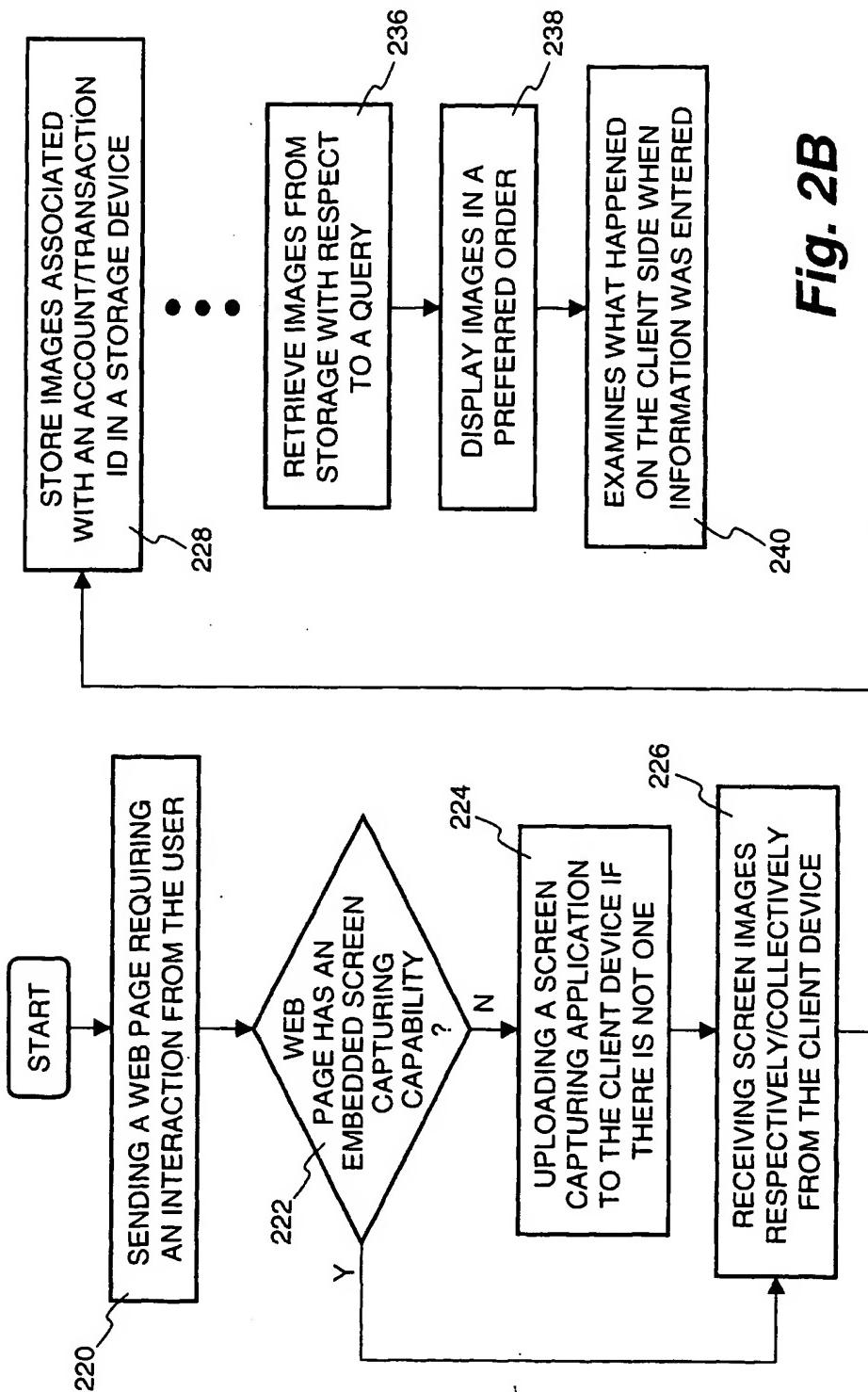


Fig. 2A

**Fig. 2B**

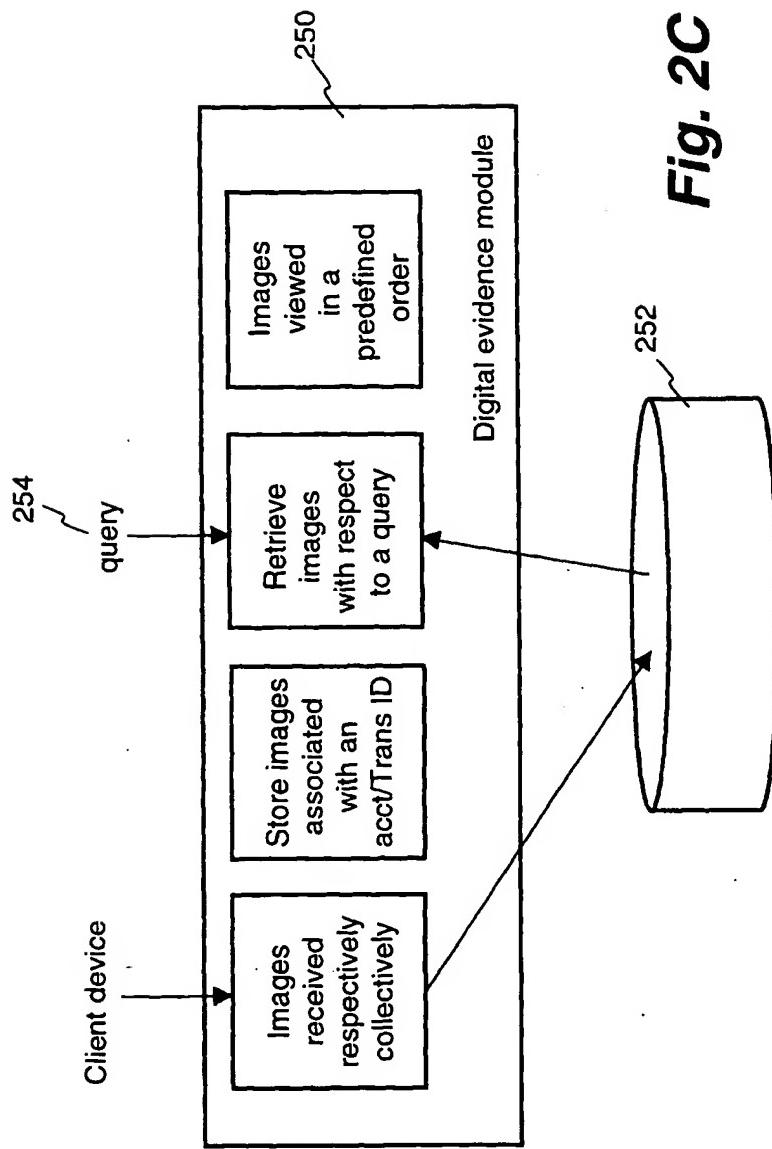


Fig. 2C

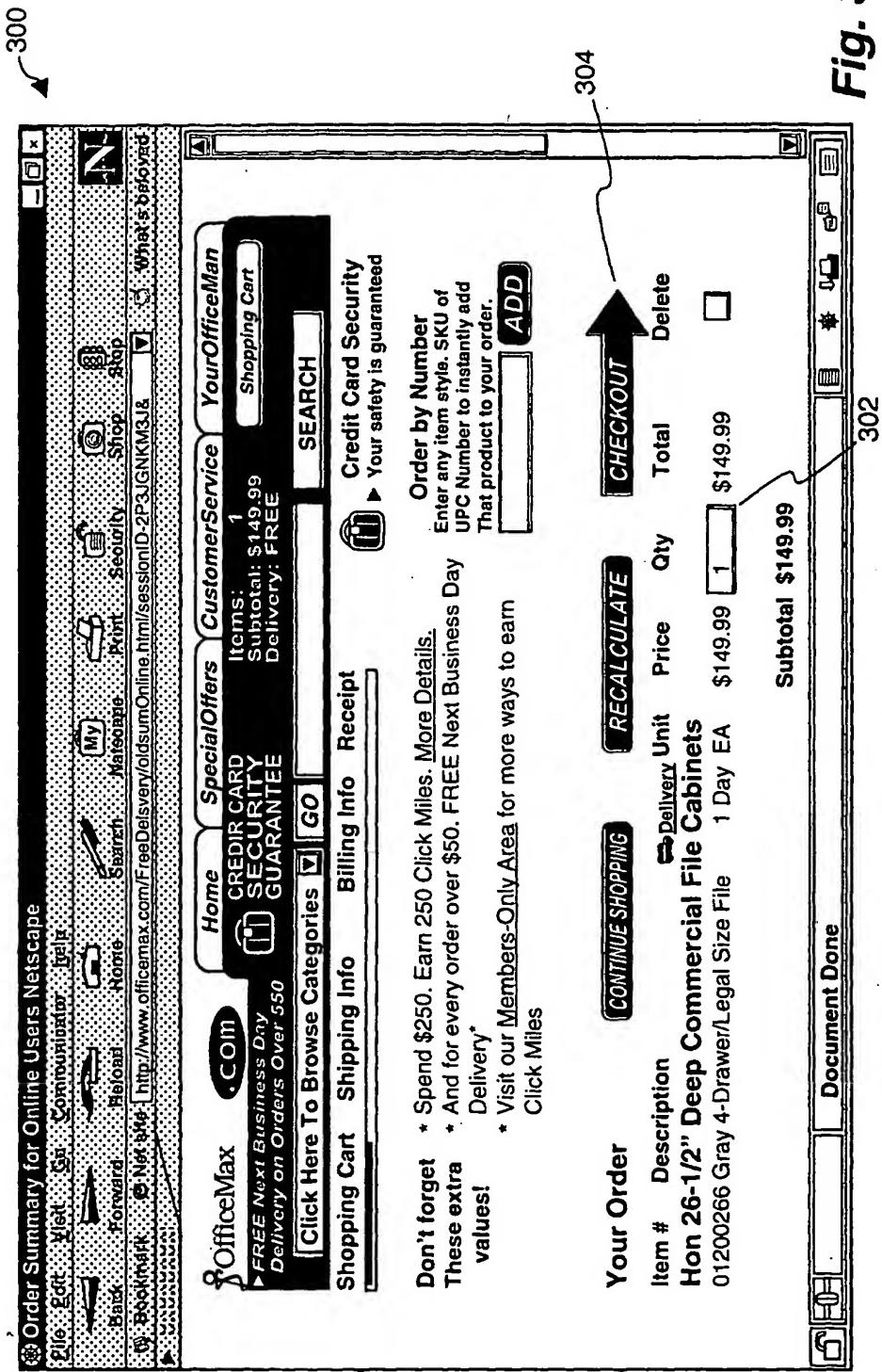


Fig. 3A

310 ↘

Customer Information - Online - Netscape

File Edit View CommCenter Help

Send Forward Back Home Search Message My Kurt Security Shop Shop N

Bookmarks Net sites http://www.officemax.com/FreeDelivery/oldsumOnline.html/sessionID=2P3IGNKNM31& What's different

Company Title*

Email address OfficeMax Tax Exempt #*

Select a User Name Enter Password
(Password must be between 5 & 15 characters)

Mother's Maiden Name Verify Password

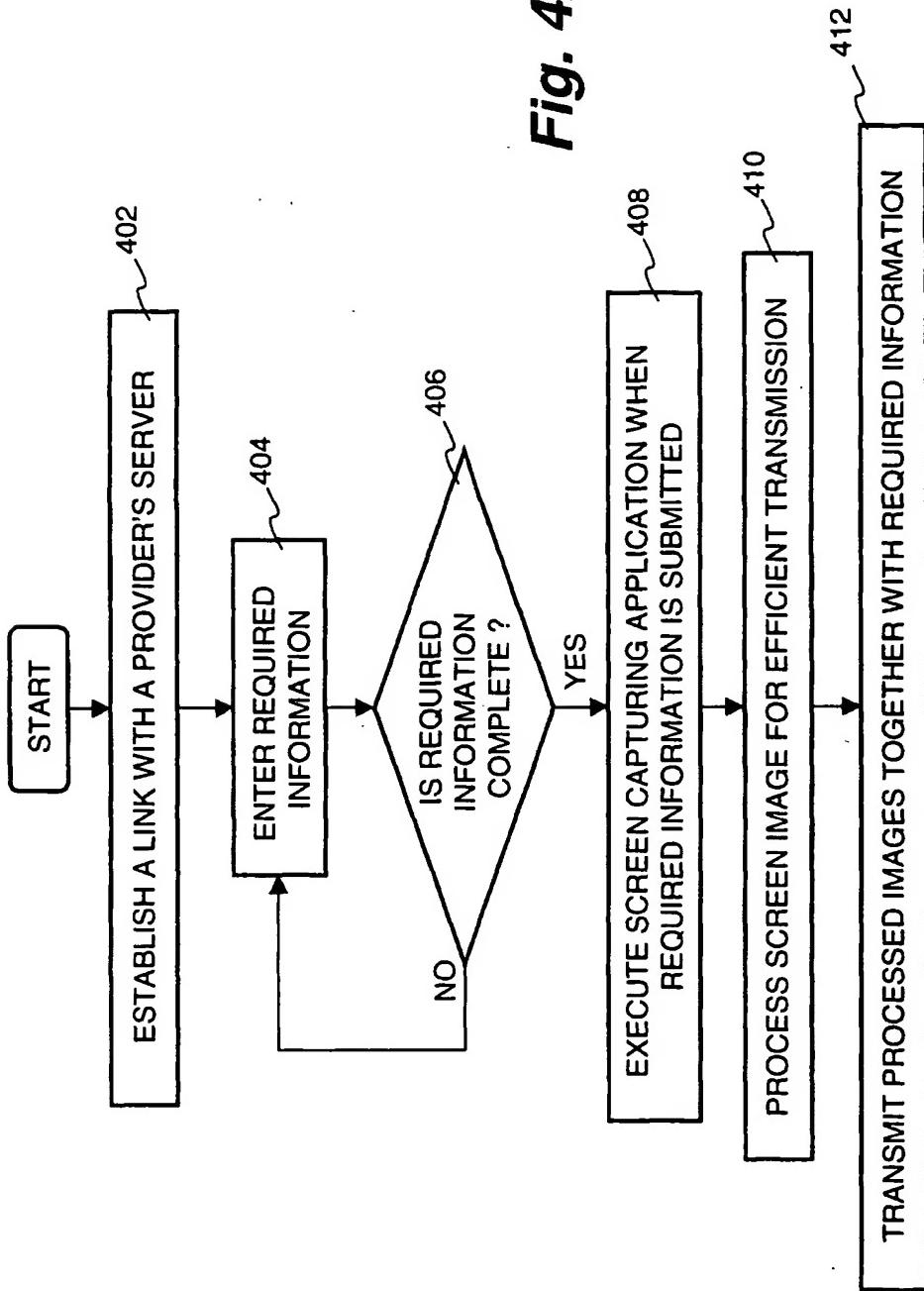
Ship To:
Name Ship-to-Phone
Address 1 Extension*
Address 2*
City Ship-to-Fax*
State Country
Zip USA

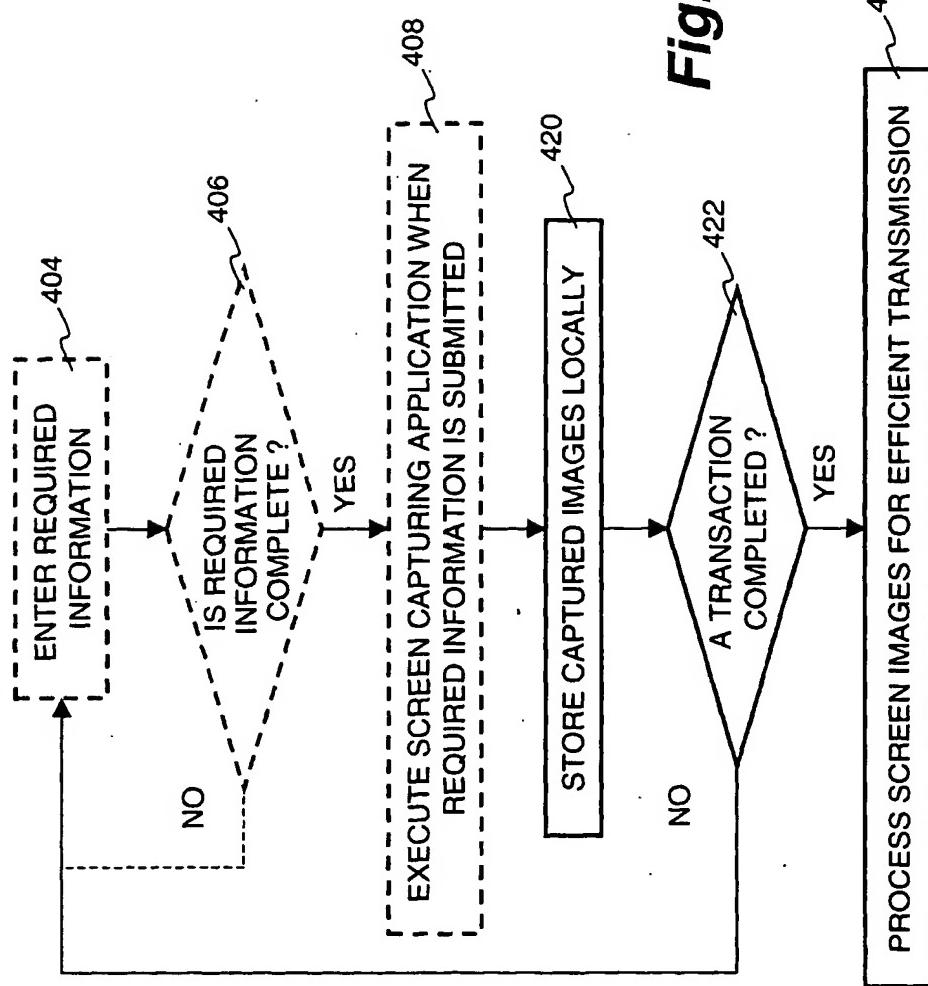
Yes! I Want to receive special offers via email CONTINUE

POWERED BY:
LISTSERV

Document Done

Fig. 3B

Fig. 4A





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(54) Method and system for tracking screen activities in online transactions

(57) A digital evidence system is disclosed. According to one embodiment, the digital evidence system records pertinent screen activities such as data entry into an electronic form, verification of a data transfer and a purchase order by capturing images of displayed web

pages requiring interactions from the user. The captured images are transmitted back to the business and can be retrieved according to a query about any interaction so that the online business could determine what has happened on the user side when a transaction was engaged with the online business.

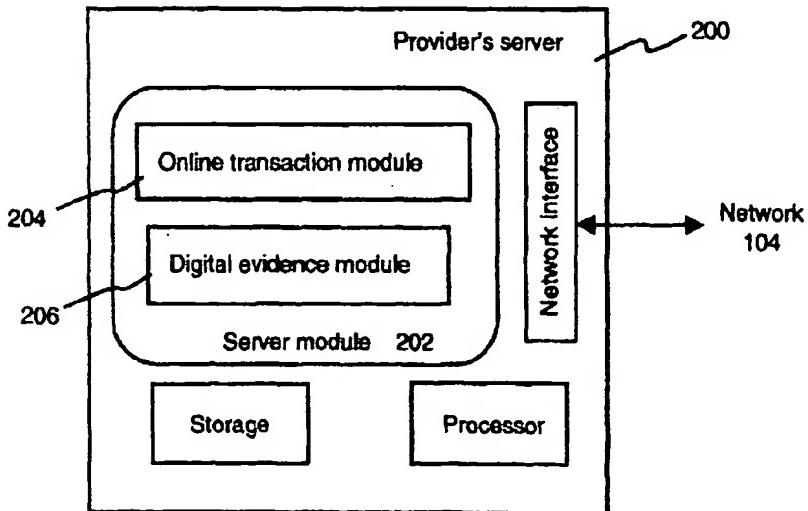


Fig. 2A



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 30 0722

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)						
Y	<p>WO 99 13423 A (NARRATIVE COMMUNICATIONS CORP) 18 March 1999 (1999-03-18)</p> <p>* abstract *</p> <p>* page 3, line 25 - page 4, last line *</p> <p>* page 7, line 11 - page 11, line 21 *</p> <p>* figures 1,2 *</p> <p>-----</p>	1-10	G06F17/60 G06F1/00 G07F7/10						
Y	<p>SUSAN CHARLES: "Product Review - SnagIt by Techsmith (v. 4.1)" INTERNET DOCUMENT, 'Online' 15 August 1998 (1998-08-15), pages 1-2, XP002176992</p> <p>Retrieved from the Internet: <URL: http://www.l1rx.com/extras/snagit.htm> 'retrieved on 2001-08-07!'</p> <p>* the whole document *</p> <p>-----</p>	1-10							
Y	<p>BRADLEY, JOHN: "XV, Interactive Image Display for the X Windows System" INTERNET DOCUMENT, 'Online' 29 December 1994 (1994-12-29), pages 24-25, XP002176993</p> <p>Retrieved from the Internet: <URL: ftp://ftp.cys.upenn.edu/pub/xv/docs/xvdocs.pdf> 'retrieved on 2001-08-06!'</p> <p>* the whole document *</p> <p>-----</p>	1-10							
A	<p>WO 98 20405 A (WEI YUEPING ;CEN AMBIN (US); U C MEDIA INC (US)) 14 May 1998 (1998-05-14)</p> <p>* abstract *</p> <p>* page 3, line 1 - page 4, line 9 *</p> <p>* page 8, line 7 - line 19 *</p> <p>* figures 1,2 *</p> <p>-----</p>	1-4,7-9							
<p>The present search report has been drawn up for all claims</p> <table border="1"> <tr> <td>Place of search</td> <td>Date of completion of the search</td> <td>Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>7 September 2001</td> <td>Nicoli, F</td> </tr> </table> <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>				Place of search	Date of completion of the search	Examiner	THE HAGUE	7 September 2001	Nicoli, F
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THE HAGUE	7 September 2001	Nicoli, F							

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ON EUROPEAN PATENT APPLICATION NO.**

EP 01 30 0722

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
 The members are as contained in the European Patent Office EDP file on
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07-09-2001

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